

REMARKS

In the final office action, the examiner repeats the rejection of claims 1-9 without further explanation of the reasons for rejection because "Applicant does not give arguments against the 35 USC 103 rejections made in the last office action."

The applicants believed they were giving arguments when they enclosed a copy of their Response to PCT Written Opinion, because the examiner's reasons for rejection in the first U.S. office action were essentially word-for-word the same as were given by the same examiner in the PCT Written Opinion. The examiner considered those arguments persuasive in the PCT IPRP, and therefore the applicants have not to this day received any explanation of why they are no longer considered persuasive. The applicants were not informed even of the *fact* that their PCT arguments were reconsidered during the U.S. examination and found wanting until the final office action: "Upon further review of applicant's claims in the US application, it was determined that the claims were not [sic?] obvious over the prior art." Still, no explanation of the reasons for that reassessment was given.

Thus, the applicant had nothing new to respond to, and re-presented the arguments made when the rejections were first given. Now, the applicants still have nothing new to respond to and are on final rejection. To the applicants, this does not seem to be a realization of the policy underlying the Patent Cooperation Treaty.

The applicants can now only repeat the arguments given in the Response to PCT Written Opinion, only this time observing the formality of presenting these arguments as though they are new, yet knowing in advance that the arguments will no longer persuade, but having no idea why.

Before re-presenting the applicants' arguments against the § 103 rejections based on the Andersen patent and the Jeffryes patent, the applicants wish to bring up another matter. In the PCT examination process, the applicants added claims 10-21 under Article 34. In the PCT IPRP, the examiner declared claims 1-9 and 21 both novel and inventive. Throughout the examination of the U.S. application, the examiner has acknowledged the existence of only claims 1-9, even though the PCT amendment was pointed out by the applicants in their reply to the first U.S. office

action. The applicants now understand that a PCT amendment made after the date of entry into the U.S. national phase must be separately amended in the U.S. prosecution. Accordingly, the applicants select four of the new claims from the Article 34 claim amendments to add by amendment herein, and the applicants request that the examiner exercise his discretion in favor of entering these amendments.

§ 103 rejections

The examiner contends that U.S. Patent No. 5,410,517. ("Andersen") and PCT patent publication WO 01/61379 ("Jeffryes") combine to make the claims of the present application obvious. The applicants respectfully disagree, and believe they show below that the examiner has misunderstood the teachings of the present application, or of the two prior art references, or both.

Among other features, the present invention is a method for (a) separating the seismic responses due to a plurality of simultaneously operating vibrators while (b) eliminating unproductive listening time between consecutive vibrator sweeps. Andersen explains the problem of unproductive listening time at col. 2, lines 15-33; see also paragraph 12 of the present application. As Jeffryes explains at page 1, lines 22-27, when multiple simultaneous vibrators are used, it is preferable to separate the data recorded at each receiver into the separate contributions due to each individual vibrator.

Andersen discloses a method (different from the applicants' method) for eliminating listen time, but does not disclose any method for separating multiple vibrator responses. Jeffryes discloses a method for separating multiple vibrator responses (different from the applicants' method), but does not disclose any way to eliminate listening time. The two references combined neither teach nor suggest the applicants' method.

The applicants believe the examiner has confused the sweep "segment" of the present invention with Jeffryes's "sweep." The applicants' sweep segments are combined to form a single "sweep" because they require no dead time between segments, and in preferred embodiments, have no dead time for listening, equipment recovery or any other reason. The applicants are able nevertheless to separate the

response in key part because of the applicants' *parsing* step (neither disclosed nor suggested in either reference). The examiner contends that Jeffryes discloses the applicants' parsing step, but this is a misunderstanding. Jeffryes does not do so, and furthermore has no reason to do so because his n separate records are naturally defined with no loss of data by including the listening time after each shot or sweep.

The reader must exercise a little judgment in reading Jeffryes to realize that he does not suggest eliminating the listen time, and in fact relies on it to define his n separate data records. Jeffryes never mentions listening time, because he does not intend to depart from the customary vibrator technique of separating consecutive sweeps by a listening time so that the full response from each sweep may be captured. A copy of a page from Sheriff's Encyclopedic Dictionary of Applied Geophysics, 4th Ed., published by the Society of Exploration Geophysicists, is enclosed. It contains an illustration of a typical vibroseis record (Fig. V-12). It can easily be seen that the response ("return") continues for a period of time after the sweep signal is finished. As stated above, Andersen's column 2, lines 15-33 provide ample authority for the typical practice of following each sweep by a listen period during which the vibrator is not sweeping. Figure V-12 shows why such a listening period is used, as does Jeffryes's Fig. 1. If Jeffryes's separate sweeps were stacked end-to end with no listening time, his data records would not be complete because he discloses no way to extend them to include the response lag at the end of each sweep. His method, with no listen time, would use data records that would necessarily be incomplete.

Andersen's method cannot be combined with Jeffryes's method to solve this listening time problem. Andersen can eliminate listening time because he is not trying to separate records from multiple vibrators, for which it is important to capture the full response for each sweep. There is nothing in Andersen about separating records from multiple vibrators. Multiple vibrators can be used in Andersen's method to increase the energy transmitted into the ground, but all vibrators in such an embodiment would be shaking the same, driven by the same sweep signal, and there would be no attempt to separate the summed seismic response. This introduces inaccuracies in the data, which is why the applicants and others have developed ways to separate the data. Furthermore, it is noted that the examiner uses Andersen in

connection with the data processing steps of the applicants' claim 1, and not in connection with the data acquisition steps. It is not surprising that Andersen provides nothing of relevance in such combination with Jeffryes because the invention of the applicants' claim 1 uses an inversion method for processing the vibrator data (see paragraph 8 on page 4 of the present application), which is a fundamentally different approach than the traditional correlation method of processing vibroseis data that Andersen uses (see Andersen, col. 1, line 54 to col. 2, line 3). (The word *inversion* is not used, but that is what steps (h)-(i) of claim 1 are describing.)

In the end, it is sufficient that neither of the references discloses or suggests steps (d) and (f) in the applicants' claim 1. In step (f), when the seismic data record is parsed into M shorter records, a portion of each shorter record is reused in the next shorter record, i.e., the last few seconds of the one record is also used as the first few seconds of the next. Thus, the applicants' parsing is not merely dividing the record into contiguous, non-overlapping segments, such as the segments of the vibrator sweep described in step (a) of claim 1. This type of parsing is neither disclosed nor suggested in Jeffryes or Andersen. The explanation just given of parsing is worded in conversational English. The corresponding wording in steps (d) and (f) of claim 1 is not the same, but the effect is the same.

CONCLUSION

The applicants believe that claims 1-13 are each patentably distinct from all prior art, including all art cited by the examiner. The applicants request an advisory opinion reconsideration making all claims allowable, or at least explaining where the applicants' above stated reasoning is faulty.

The Commissioner is authorized to charge the requisite fee of \$420.00 for the two additional independent claims in excess of three, and any additional fees which may be required, to Account No. 05-1328.

Respectfully submitted,

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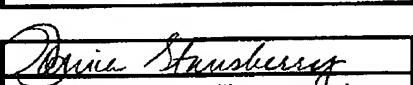
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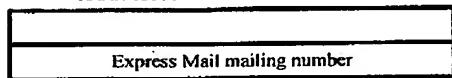
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